Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Original) A gas detector comprising:

a high-temp exothermic detector unit having a high-temp exothermic gas sensor element and a high-temp exothermic temperature sensor element, each of the sensor elements made of a resistor of which a resistance changes responsive to temperature, the high-temp exothermic gas sensor element exposed to a gas being detected, and the high-temp exothermic temperature sensor element sealed in an unperforated casing filled with dry air and maintained to generate heat to a temperature substantially equal to a self-heating temperature of the high-temp exothermic gas sensor element as measured in dry air; and

a low-temp exothermic detector unit having a low-temp exothermic gas sensor element and a low-temp exothermic temperature sensor element, each of the sensor elements made of a resistor of which a resistance changes responsive to temperature, the low-temp exothermic gas sensor element exposed to the gas being detected, and the low-temp exothermic temperature sensor element sealed in another unperforated casing filled with dry air and maintained to generate heat to a temperature substantially equal to a self-heating temperature of the low-temp exothermic gas sensor element as measured in dry air,

wherein the self-heating temperature of the high-temp exothermic gas sensor element and the high-temp exothermic temperature sensor element of the high-temp exothermic detector unit is set to be different from the self-heating temperature of the low-temp exothermic gas sensor element and the low-temp exothermic temperature sensor element of the low-temp exothermic detector unit as measured in the dry air, and

further wherein the gas detector performs processes of:

converting resistance values of the individual gas sensor elements that change responsive to hydrogen concentration, humidity and an ambient temperature, and resistance values of the individual temperature sensor elements that change responsive to the ambient

temperature into electrical gas-level outputs corresponding to the hydrogen concentration and the humidity;

normalizing the gas-level outputs gained from the individual detector units by using a hydrogen sensitivity conversion factor obtained under a known level of hydrogen concentration;

obtaining a humidity-level output derived as a difference between the normalized outputs; and

producing outputs representing levels of the hydrogen concentration and the humidity by correcting the normalized outputs with a humidity-level correction formula established through a correlation of a humidity-level correction value obtained from the humidity-level output gained under an environment of known humidity level and the individual normalized outputs responsive to the humidity.

2. (Original) The gas detector as set forth in claim 1, wherein the heating temperatures of the two elements of the low-temp exothermic detector unit and the two elements of the high-temp exothermic detector unit in the dry air are controlled to be constant irrespective of the ambient temperature.

3. (Original) The gas detector as set forth in claim 2, wherein:

each of the low-temp exothermic detector unit and the high-temp exothermic detector unit further comprises an element resistance regulating circuit having at least two resistors connected in series for producing a control voltage used for controlling the heating temperatures constant, and an ambient temperature detecting circuit having a resistor connected in series to respective one of the temperature sensor elements for producing a to-be-controlled voltage; and

the method of controlling the heating temperatures of the two sensor elements in each of the low-temp exothermic detector unit and the high-temp exothermic detector unit comprises regulating a voltage applied to the element resistance regulating circuit and the ambient temperature detecting circuit in a manner to equalize the to-be-controlled voltage with the control voltage.

4. (Original) The gas detector as set forth in claim 3, wherein:

each of the low-temp exothermic detector unit and the high-temp exothermic detector unit further comprises a reference voltage circuit having at least two resistors and a variable resistor connected in series for producing a reference voltage, and a gas detecting circuit having a resistor connected in series to respective one of the gas sensor elements for producing a gas-level output voltage; and

each of the detector units produces a difference in potential between the reference voltage and the gas-level output voltage as the gas-level output.

5. (Original) The gas detector as set forth in claim 1, wherein a temperature-dependent hydrogen sensitivity conversion factor of each of the low-temp exothermic detector unit and the high-temp exothermic detector unit is corrected with a sensitivity correction formula derived from a correlation between the output of the respective one of the temperature sensor elements and the hydrogen sensitivity conversion factor under the environment of various ambient temperatures.

6. (Original) The gas detector as set forth in claim 1, wherein:

the high-temp exothermic detector unit further comprises a second high-temp exothermic temperature sensor element made of a resistor of which a resistance changes responsive to temperature, sealed in an unperforated casing filled with dry air and maintained to generate heat to a temperature substantially equal to the self-heating temperature of the high-temp exothermic gas sensor element in dry air;

the low-temp exothermic detector unit further comprises a second low-temp exothermic temperature sensor element made of a resistor of which a resistance changes responsive to temperature, sealed in an unperforated casing filled with dry air and maintained to generate heat to a temperature substantially equal to the self-heating temperature of the low-temp exothermic gas sensor element in dry air; and

the self-heating temperature of the high-temp exothermic gas sensor element, the high-temp exothermic temperature sensor element and the second high-temp exothermic

temperature sensor element of the high-temp exothermic detector unit is set to be different from the self-heating temperature in the dry air of the low-temp exothermic gas sensor element, the low-temp exothermic temperature sensor element and the second low-temp exothermic temperature sensor element of the low-temp exothermic detector unit, and

wherein the gas detector performs processes of:

converting resistance values of the individual gas sensor elements that change responsive to hydrogen concentration, humidity and an ambient temperature, and resistance values of the individual temperature sensor elements and the individual second temperature sensor elements that change responsive to the ambient temperature into electrical gas-level outputs corresponding to the hydrogen concentration and the humidity;

normalizing the gas-level outputs gained from the individual detector units by using a hydrogen sensitivity conversion factor obtained under a known level of hydrogen concentration;

obtaining a humidity-level output derived as a difference between the normalized outputs; and

producing outputs representing levels of the hydrogen concentration and the humidity by correcting the normalized outputs with a humidity-level correction formula established through a correlation of a humidity-level correction value obtained from the humidity-level output gained under an environment of known humidity level and the individual normalized outputs responsive to the humidity.

7. (Original) The gas detector as set forth in claim 6, wherein the heating temperatures of the three elements of the low-temp exothermic detector unit and the three elements of the high-temp exothermic detector unit in the dry air are controlled to be constant irrespective of the ambient temperature.

8. (Original) The gas detector as set forth in claim 7, wherein:

each of the low-temp exothermic detector unit and the high-temp exothermic detector unit further comprises an element resistance regulating circuit having at least two resistors

connected in series for producing a control voltage used for controlling the heating temperatures constant, and an ambient temperature detecting circuit having a resistor connected in series to respective one of the temperature sensor elements for producing a to-be-controlled voltage; and

the method of controlling the heating temperatures of the two sensor elements in each of the low-temp exothermic detector unit and the high-temp exothermic detector unit comprises regulating a voltage applied to the element resistance regulating circuit and the ambient temperature detecting circuit in a manner to equalize the to-be-controlled voltage with the control voltage.

9. (Original) The gas detector as set forth in claim 8, wherein:

each of the detector units further comprises a reference voltage circuit having at least two resistors and a variable resistor connected in series for producing a reference voltage, and a gas detecting circuit having respective one of the second temperature sensor elements connected in series to respective one of the gas sensor elements for producing a gas-level output voltage; and

each of the detector units produces a difference in potential between the reference voltage and the gas-level output voltage as the gas-level output.

10. (Original) The gas detector as set forth in claim 6, wherein a temperature-dependent hydrogen sensitivity conversion factor of each of the detector units is corrected with a sensitivity correction formula derived from a correlation between any of the outputs of the respective ones of the temperature sensor elements and the second temperature sensor elements, and the hydrogen sensitivity conversion factor under the environment of various ambient temperatures.

11. (Currently Amended) The gas detector as set forth in ~~one of~~ claim 1 ~~and claim 6~~, wherein the high-temp exothermic gas sensor element and the low-temp exothermic gas sensor element are individually placed inside perforated casings, and parts of the perforated casings are connected with a heat conductive plate.

12. (Currently Amended) The gas detector as set forth in ~~one of~~ claim 1 ~~and claim 6~~, wherein each of the sensor elements of the low-temp exothermic detector unit and the high-temp exothermic detector unit comprises a thermistor.

13. (Currently Amended) The gas detector as set forth in ~~one of~~ claim 1 ~~and claim 6~~, wherein a difference in the heating temperatures is set to be 10°C or greater between the individual sensor elements of the low-temp exothermic detector unit and the individual sensor elements of the high-temp exothermic detector unit.

14. (Currently Amended) The gas detector as set forth in ~~one of~~ claim 1 ~~and claim 6~~, wherein the heating temperature of the individual sensor elements of the low-temp exothermic detector unit is set to 100°C or higher.

15. (Currently Amended) The gas detector as set forth in ~~one of~~ claim 1 ~~and claim 6~~, further comprising a heater disposed in the vicinity of the individual sensor elements of the low-temp exothermic detector unit and the high-temp exothermic detector unit.